

RECEIVED
CENTRAL FAX CENTER**Serial No. 09/831,432**
Art Unit: 1751**JUL 25 2007****REMARKS**

Claims 1-14 and 32 have been canceled. The claims have been amended to delete the term "anionic surfactant free" in relation to the rinse aid composition in view of the Examiner's objection to the term. The dependencies of the claims have been amended in view of cancellation of claims. No new matter has been entered by way of amendment to the claims.

Claims 14, 18 and 31 stand rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. The Examiner states:

"The aforementioned claims state that the claims have a "narrow" homolog distribution. The examiner contends that this terminology is indefinite because the specification does not adequately define what "narrow" encompasses."

Applicants respectfully submit that the term narrow homolog distribution is well known and utilized by one skilled in the alkoxylation art. Applicants herewith submit for the Examiner's convenience copies of four pages from Ullmann's Encyclopedia (an eminent reference work) in relation to nonionic surfactants. As described in the materials submitted herewith, the alkoxylation rate for alcohols and carboxylic acids differ and the average number of alkoxide units attached to the basic moiety can differ over a broad range. A poisson-like homologue distribution is a so-called narrow range ethoxylate and has advantages in some applications. The statement appears at the page numbered 4, at line 2 of the portion of Ullmann's Encyclopedia submitted herewith.

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Applicants respectfully submit that the term "narrow range alkoxylates" would be well known and understood by one skilled in the art. Applicants therefore respectfully request that the rejection under 35 USC 112, second paragraph, be reconsidered and withdrawn.

Claims 14-17, 25-28, 31, 33-35 stand rejected under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(a) as obvious over JP 05-202382. Applicants respectfully submit that from the abstract provided by the Examiner and a copy of the publication in Japanese, Applicants cannot determine the nature of the composition utilized in JP '382. Applicants are not certain if the composition is anionic surfactant free or utilizes a narrow range alkoxylated carboxylic acid ester. Applicants have perused the Japanese specification and note that it contains several pages which appear to be extensive tables containing data which may be related to compositions of the invention. However, Applicants are not able to read the Japanese text or the headings in the table to determine the nature of the information set forth and were not able to obtain a computer translation of the application from the Japanese Patent Office website. Applicants therefore respectfully request that the Examiner provide a translation of the Japanese publication so that it can be studied and understood by Applicants.

Since Applicants are not certain that the Japanese reference discloses an anionic surfactant free composition or the use of a narrow range alkoxylate from studying the Abstract, Applicants will not further analyze the teachings of the Japanese reference.

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Claims 18-19, 24, 29-30 and 32-37 stand rejected under 35 USC 103(a) as unpatentable over JP (05-202382; hereinafter JP '382) in view of Haerer et al. (US 5,602,093). Applicants respectfully submit to the best of their knowledge, JP '302 in view of Haerer et al. neither teaches nor suggests the present invention.

JP '382 has been discussed above. Applicants are not certain of the teachings of the reference and therefore have requested that a translation be furnished.

Haerer et al. discloses dishwashing rinse aids containing an alkylpolyglycoside and an alkylpolyglycol ether and organic carboxylic acids. The nonionic surfactants disclosed in the Haerer et al. composition correspond to some of the additional nonionic surfactants in the composition of the present invention. However, Applicants respectfully submit that one skilled in the art would have no incentive to combine the teachings of Haerer et al. with the teachings of JP '382 since both of the applications disclose what appear to be complete rinse aid formulations which do not contain the extraneous compounds disclosed in the other reference. That is, Haerer et al. discloses a complete rinsing aid without need for inclusion of the alkoxylated carboxylic acid ester useful in the practice of the present invention. In addition, Haerer et al. does not cure the deficiencies in the teaching of the abstract of JP '382 since there is neither teaching nor suggestion that the alkoxylate carboxylic acid ester is a narrow range composition.

Applicants further submit that there is no incentive for one skilled in the art to combine the teachings of Haerer et al. with the teachings of JP '382 since each of the

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references disclose a complete rinsing aid composition and would neither teach nor suggest the introduction of the additional components into the composition. Applicants therefore respectfully request that the rejection of the claims under 35 USC 103(a) over the combination of JP '382 with Haerer et al. be reconsidered and withdrawn.

Claims 21 and 22 stand rejected under 35 USC 103(a) as unpatentable over JP '382 in view of Lewis (US 5,612,305). Applicants respectfully submit that JP '382 in view of Lewis would neither teach nor suggest the present invention as claimed in claims 21 and 22. Applicants respectfully submit that as discussed above, JP '382 abstract neither teaches nor suggests the present invention. That is, JP '382 abstract neither teaches nor suggests that the alkoxylated fatty acid ester be alkoxylated fatty acid ester with a narrow homolog distribution range.

The deficiencies in JP '382 are not cured by combination with Lewis. Lewis discloses mixed surfactant systems for low-foam application. However, none of the mixed surfactants comprised an alkoxylated fatty acid ester with a narrow homolog distribution. Applicants therefore respectfully submit that Lewis does not cure the deficiencies in JP '382.

In addition, Applicants invite the Examiner's attention to Lewis, particularly at col. 18, beginning at line 55 through col. 19, lines 32. As pointed out by Lewis, not all nonionic surfactants are compatible with each other. Compatibility is a requirement for providing a composition with useful properties. Since one cannot arbitrarily mix various nonionic

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surfactants and determine compatibility in advance to provide a useful composition, one skilled in the art would have to do an undue amount of experimental testing to arrive at a nonionic compatible surfactant mixture including the alkoxylated fatty acid esters with the narrow homolog distribution. In view of the undue experimentation which would be required to combine the teachings of Lewis with JP '382, Applicants respectfully submit that the rejection is based on hindsight reconstruction of Applicants' invention. Favorable consideration and allowance of the claims is respectfully requested.

Claims 20-23 stand rejected under 35 USC 103(a) as unpatentable over JP '382 in view of Kwetkat et al. (US 6,156,721). Applicants respectfully submit that JP '382 and Kwetkat et al. whether considered alone or in combination neither teaches nor suggests the present invention.

The deficiencies in JP '382 have been discussed in great detail above. The deficiencies in the reference are not cured by combination with Kwetkat et al. In the official action, the Examiner is mischaracterizing the teachings of Kwetkat et al. Kwetkat et al. is directed to a surfactant composition containing a particular gemini surfactant which is an anionic surfactant. The additional nonionic surfactants suggested by Kwetkat et al. for inclusion in the surfactant mixture containing the gemini anionic surfactant, are the hydroxy mixed ethers and the N-methyl alkylglucamides. The combination of the gemini anionic surfactants with the hydroxy mixed ethers and the N-methyl alkylglucamides, in combination with JP '382 would neither teach nor suggest the present invention. There is

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neither teaching nor suggestion to remove the critical gemini anionic surfactant from the composition to arrive at the rinse-aid composition useful in the present invention.

JP '382 is directed to a nonionic surfactant which the Examiner states can be mixed with the various surfactants disclosed in Kwetkat et al. However, Applicants respectfully submit that the Kwetkat et al. composition is clearly different and distinct from the composition of JP '382 and the composition of the present invention. As disclosed in Kwetkat et al., the composition must contain the gemini anionic surfactant. In view of the strict requirements for a rinse-aid composition, Applicants respectfully submit that any reference which disclosed a mixture of a nonionic and anionic surfactants and in particular the gemini surfactants would neither teach nor suggest the additional nonionic surfactants which would be useful in the practice of the present invention. Applicants submit that a composition containing a specific gemini anionic surfactant along with additional nonionic surfactants, would neither teach nor suggest to one skilled in the art to include the nonionic surfactants in a composition containing an alkoxylated fatty acid ester with a narrow homolog distribution. Applicants therefore respectfully submit that the combination of JP '382 with Kwetkat et al. neither teaches nor suggests the present invention and a rejection based thereon is untenable. Applicants respectfully request that the rejection be reconsidered and withdrawn.

Claims 31-36 stand rejected under 35 USC 103(a) as unpatentable over Hees et al. (US 5,753,606) in view of Haerer et al. (US 5,759,987). Applicants respectfully submit that

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Hees et al. and Haerer et al., whether considered alone or in combination neither teach nor suggest the present invention.

Hees et al. is directed to a liquid detergent and multi-purpose cleaner. In one preferred embodiment the liquid detergent and multi-purpose cleaner additionally contains an anionic surfactant. The basic composition comprises a C₈₋₁₆ alkyl polyglycoside and an alkoxylated fatty acid ester. The examples in Hees et al. contain substantial amounts of anionic surfactants. This is consistent with the need for anionic surfactants in general purpose cleaning compositions discussed at pages 1 and 2 of the present application. Applicants respectfully submit that Hees et al. would neither teach nor suggest the anionic surfactant-free rinse aid composition of the present invention. In addition, Hees et al. neither teaches nor suggests that the alkoxylated fatty acid ester comprise a narrow homolog distribution composition. Applicants respectfully submit that Hees et al. neither teaches nor suggests the present invention.

The deficiencies in Hees et al. are not cured by combination with Haerer et al. '987. Haerer et al. '987 discloses rinse aid compositions for hard surfaces containing capped and uncapped mixed ethers. There is neither teaching nor suggestion that the composition contain an ethoxylated fatty acid ester.

The deficiencies in Hees et al. are not cured by combination with Haerer et al. '987. To arrive at the present invention, one skilled in the art would have to remove the anionic surfactants present in the Hees et al. composition and replace them with the alkoxylated

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alcohols which are already present in the anionic surfactant containing Hees et al. composition. Applicants respectfully submit that the combination of Hees et al. with Haerer et al. '987 would neither teach nor suggest to one skilled in the art the present invention.

In addition to the compositions of the various materials set forth in the prior art references, one skilled in the art would be mindful of the teachings of Lewis which clearly shows that one cannot arbitrarily mix various nonionic surfactants because of the incompatibility of seemingly closely related nonionic surfactants. Applicants submit that to make the combination which the Examiner has proposed is merely an invitation to experiment. Applicants submit that in view of the teachings of Lewis, one skilled in the art cannot automatically visualize a combination of nonanionic surfactants, which may not be compatible, to provide a useful composition. In view of Lewis one skilled in the art would expect undue experimentation to arrive at a compatible composition. Applicants respectfully submit that Lewis would teach one skilled in the art away from the present invention.

Applicants respectfully submit that the Examiner has not provided a *prima facie* case of obviousness in view of the teachings of Lewis and the compositions which contain anionic surfactants. In view of the above discussion, Applicants respectfully submit that the application is in condition for allowance and favorable consideration is requested.

Claims 31-36 stand rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8; 1-12; 1-11 and 25; and 1-14 of

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U.S. Patent Nos. 6,602,838; 6,384,009; 6,683,035; and 6,660,706; respectively.

Applicants respectfully submit that in view of the amendments to claims 31-36, the rejection is moot.

In view of the amendments to the claims and the above discussion, favorable consideration and allowance of the application is respectfully requested.

Respectfully submitted,



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Enclosure: Ullmann's Encyclopedia (4 pgs.)

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UHMWPE ENCYCLOPEDIA

Octadecanol ethoxylate with 12 EO

14

Octadecanol ethoxylate with 16 EO

15

> 15

Soluble, giving clear solutions
solubilizer, cleansing agent

Dodecanol/tetradecanol ethoxylate with 13 EO

15

Dodecanol/tetradecanol ethoxylate with 17 EO

16

Dodecanol/tetradecanol ethoxylate with 25 EO

17

Dodecanol/tetradecanol ethoxylate with 38 EO

18

* Moles ethylene oxide per mole.

The HLB values can be determined by emulsification tests and comparison with emulsifiers of known HLB values (see also z Emulsions).

7.2. Ethoxylates

Ethoxylates are generally obtained by addition of ethylene oxide to compounds containing dissociating

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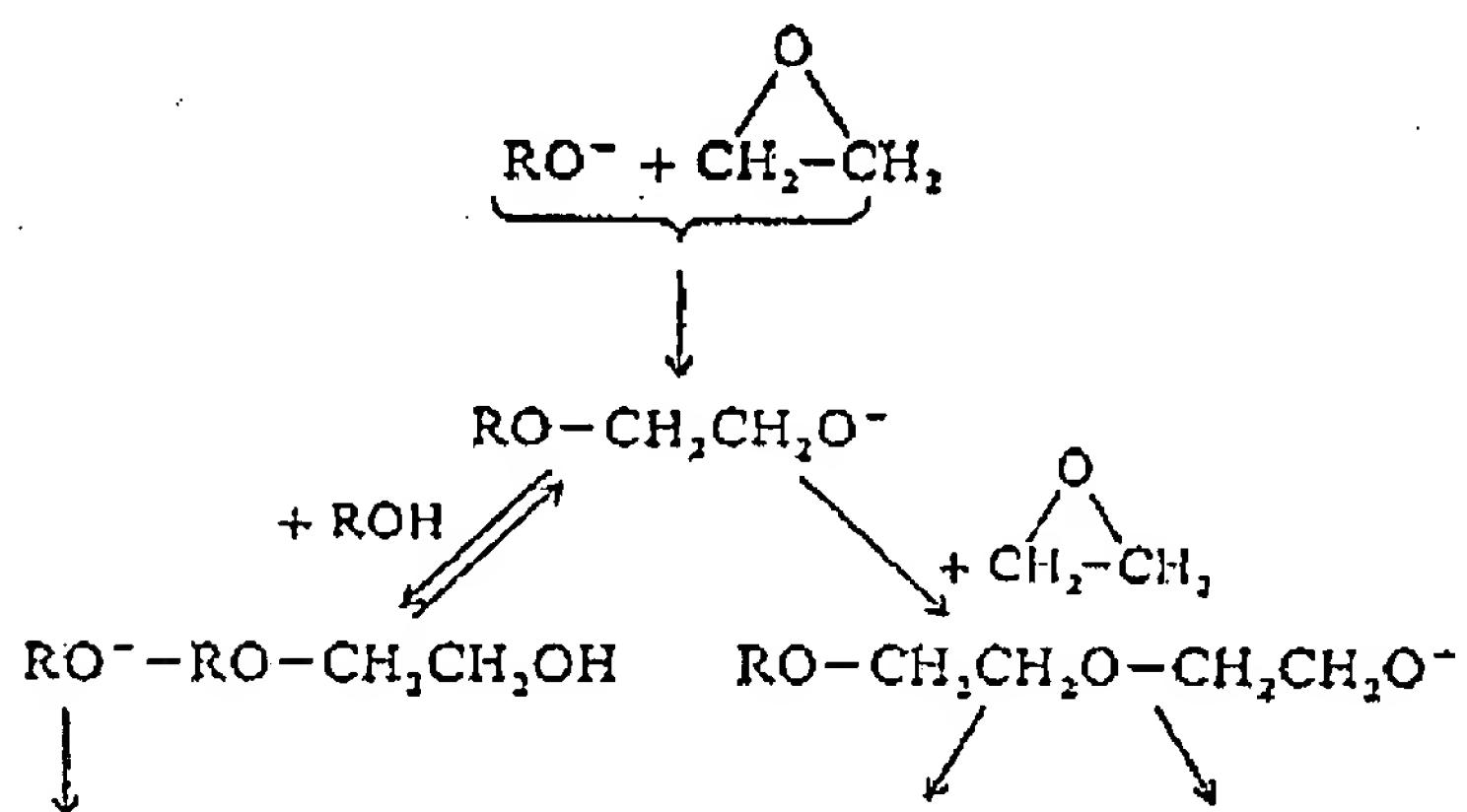
protons.

Substrates used for ethoxylation are primarily linear and branched, primary and secondary C₁₂ – C₁₈ alcohols, i.e., natural and synthetic fatty alcohols, alkylphenols with branched octyl (butene dimer), nonyl(propylene trimer) or dodecyl(propylene tetramer) groups, fatty acids, fatty acid ethanolamides, fatty amines, and fatty acid esters of polyhydroxyl compounds. The degree of ethoxylation, i.e., the molar ratio of ethylene oxide added per mole of substrate, varies within wide ranges, in general between 3 and 40, and is chosen according to the intended use (HLB value, Table 13).

The addition of ethylene oxide to a substrate containing acidic hydrogen is catalyzed by bases or (Lewis) acids.

Amphoteric catalysts, prepared in situ and probably existing as finely dispersed solids having a large surface area [94], as well as heterogeneous catalysts [95], have also been described.

The reaction mechanisms of base- catalyzed and acid- catalyzed ethoxylation differ, which affects the composition of the reaction products. In base- catalyzed ethoxylation an alcoholate anion formed initially by reaction with the catalyst (alkali metal, alkali-metal oxide, carbonate, hydroxide, or alkoxide), nucleophilically attacks ethylene oxide. The resulting anion of the ethylene oxide addition product can undergo an equilibrium reaction with the alcohol starting material or ethoxylate product, or can react further with ethylene oxide:



As this simplified reaction scheme illustrates, in alkaline- catalyzed ethoxylation several reactions proceed in parallel, the addition of ethylene oxide to an anion with the formation of an ether bond being irreversible.

Proton exchange between various anions, occurring as an ionic reaction, is fast; the addition reaction of ethylene oxide to an existing anion is the rate-determining step. Thus in a reaction mixture, the more acidic species preferentially react with ethylene oxide. If carboxylic acids or phenols are ethoxylated, the reaction proceeds exclusively via the left-hand path in the above scheme, and the initially formed monoethylene glycol ester or ether only reacts further when all the starting material in the reaction mixture is consumed. The fast equilibrium proton exchange reaction which precedes the addition of the ethylene oxide to the anionic species leads to a peculiarity of the reaction rate in the case of strongly acidic substrates such as carboxylic acids or phenols. On account of the lower nucleophilicity of their conjugate

(2)

bases corresponding to the acidic parent substances, these bases react relatively slowly with ethylene oxide; thus, the reaction proceeds slowly until the starting material is consumed. Thereafter the reaction rate increases sharply with further supply of ethylene oxide since the ethoxylate anions now present react substantially more quickly with ethylene oxide than do the anions of the carboxylic acids or phenols [96].

The situation is different in the ethoxylation of alcohols. The ether oxygen atoms in alkyl (oligo)glycol ethers increase the acidity of the terminal primary hydroxyl group compared to the initial alcohol; glycol ethers once formed thus react preferentially with ethylene oxide and lead to the formation of a mixture of homologous oligoglycol ethers, and unreacted starting alcohol remains in the reaction mixture up to high degrees of ethoxylation. This is particularly true for the ethoxylation of secondary alcohols.

Assuming the same acidity of the starting alcohol and all (oligo)glycol ethers present in the mixture, a Poisson distribution of the individual species must be expected in the ethoxylation, with a maximum corresponding to that oligoglycol ether in which the number of added ethylene oxide units corresponds to the molar ratio of ethylene oxide to starting alcohol. However, on account of the aforementioned different acidities of the individual species in the reaction mixture the homologue distribution that is actually observed in an ethoxylation mixture differs from the Poisson distribution (Fig. 20).

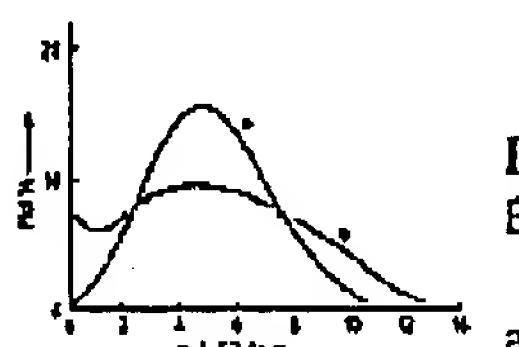
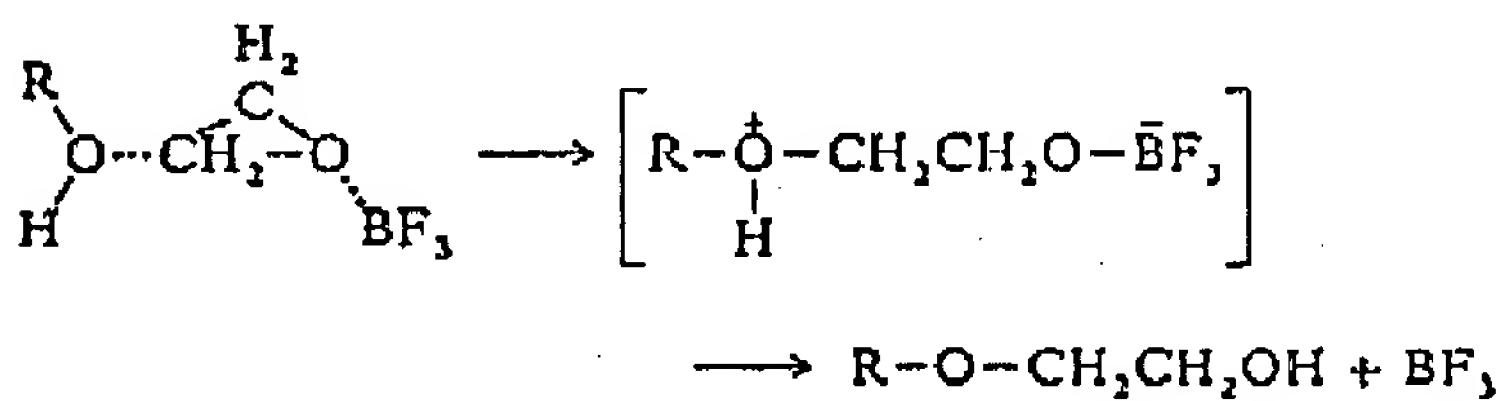


Figure 20. Homologue distribution of a lauryl ethoxylate containing 6 mol EO/mol [17]

a) Acid catalysis; b) Base catalysis

This is true for all alkaline catalysts, although the deviations in the case of alkaline-earth compounds are less strongly pronounced than in the case of sodium hydroxide or sodium methoxide [97]. The distribution pattern of the homologous polyethylene glycol ethers in an ethoxylate obtained by alkaline catalysis is independent of the temperature, pressure, and catalyst concentration [98], [99]. The occasionally observed dependence of the homologue distribution on the stirring rate can be attributed to an insufficiently complete mixing of the reactor contents.

When Lewis acids such as boron trifluoride, tin tetrachloride, or antimony pentachloride are used as catalysts, homologue distributions approximating to the Poisson distribution are obtained (Fig. 20), because here it is not the proton activity but the nucleophilicity of the substrate that determines the reaction pathway. Lewis acids activate ethylene oxide and not the alcohol:



Lewis acids have not become established as catalysts since they must be laboriously removed from the reaction product and because they lead to the formation of polyethylene glycol [the so-called polydiol,

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$\text{HO}(\text{CH}_2\text{CH}_2\text{O})_n\text{H}$], methyldioxolane and dioxane, due to side reactions and decomposition reactions.

Since ethoxylates with a narrow, Poisson-like homologue distribution, so-called narrow range ethoxylates (NRE), have advantages in some applications, amphoteric catalysts have been developed that give distributions similar to those produced by Lewis acids [94].

Among these catalysts a calcined hydrotalcite of idealized empirical formula $\text{Mg}_6\text{Al}_2\text{O}_5(\text{OH})_2$ is of interest since it can readily be handled as a pneumatically conveyable powder and can easily be separated as an insoluble solid from the reaction medium [95].

Advantages of narrow range ethoxylates, which also have a substantially lower content of starting alcohol, include: less odor, better solubility, lower volatility (reduced pluming on spray drying) and better thickening properties of both the ethoxylates and the ether sulfates derived therefrom [100-102]. However, broad distributions may also be advantageous, for example, in emulsification processes [103].